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Comment: On the Role of Appraisal Processes in the Construction of Emotion

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Abstract

Appraisal and constructivist theories of emotion both emphasize that emotions are not modular phenomena, but are constructed from more basic psychological parts. In the scientific debate, differences between the two approaches are sometimes overlaid, by classifying appraisal theories as “natural kinds” models, and sometimes underplayed, by basically merging them into constructivist accounts. The aim of this contribution is to illustrate some similarities and some differences between contemporary appraisal and constructivist approaches, and to highlight the fact that appraisal theory has indeed already confronted the idea of construction in the elicitation of emotion. In doing so, I want to argue that, while there is a distinction between appraisal and constructivist camps, it is not as stark as one might think, even though the names of the “ingredients” of emotions may differ.

Keywords

appraisal, cognition, constructivism, emotion

The last two decades have seen an enormous increase in research on the neural substrates and mechanisms of emotion, providing new impetus to theoretical debates about the psychological mechanisms of emotion elicitation. A lot of initial neuroimaging work was based on a basic emotion approach, which assumes that emotions are modular responses, elicited by a specific type of event that triggers a dedicated affect program (Ekman, 1992; Panksepp, 1998; Tomkins, 1962). Many studies tried to isolate and identify neural regions specialized in the processing of one of the basic emotions, labeling the amygdala as “fear module” (Öhman & Mineka, 2001) and the insula as a region specialized in disgust processing (Wright, He, Shapira, Goodman, & Liu, 2004). However, more and more accumulating brain data provided no unequivocal empirical support for a modular organization of neural responses around a few emotions such as fear, anger, disgust, or joy (Cunningham & Brosch, 2012; Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012; but see Vytal & Hamann, 2010).

The relative absence of neuroimaging support for basic emotion theory has led to a renewed interest in constructivist approaches to emotion (Barrett, 2006; Clore & Ortony, 2013; Cunningham, Dunfield, & Stillman, 2013; Lindquist, 2013; Russell, 2003). Constructivist accounts assume that there is no biological distinction between different emotion categories, and that emotions are constructed out of more basic psychological ingredients that are not specific to emotion (Gendron & Barrett, 2009). They highlight the importance of the individual interpretation and categorization of internal affective states, which is informed by knowledge about the situational context.

Appraisal theories of emotion similarly emphasize that emotions are not modular phenomena triggered by a specific stimulus. Instead, the appraisal of the relevance of a stimulus or situation for the concerns of the individual according to a set of defined criteria is thought to underlie the elicitation of an emotional response. This relational appraisal explains why similar emotional states can be produced by very different stimuli, and why the same stimulus can lead to different emotional states on different occasions or in different individuals. Thus, appraisal and constructivist approaches agree that emotions are constructed from more basic parts, and that situational context plays an important role in the elicitation of an emotional response. Whereas the two approaches can be seen as neighbors on a continuum of emotion conceptions (Gross & Barrett, 2011), in the course of scientific debate the differences between appraisal and constructivist approaches are sometimes overlaid—for example, by focusing on appraisal theorists that assume that appraisal triggers basic emotional states (Roseman, 1991) and classifying appraisal models as “natural kinds” models (Barrett, 2006; Lindquist, 2013), and sometimes underplayed—by focusing on theorists advocating structural models which see appraisals as useful descriptions of situations that differentiate between emotions, but not as the actual causes of emotions (Ortony, Clore, & Collins, 1988). “Noncausal” appraisal models are then basically merged into constructivist accounts (Clore & Ortony, 2013; Gross & Barrett, 2011; Lindquist, 2013). Given the consensus of a large number of appraisal theorists on some central issues, a division based on

the “fringes” of the appraisal theory spectrum does not do justice to the group of appraisal theories as a whole. While some theorists have indeed developed appraisal profiles with the aim of specifying the elicitation of basic emotions (Roseman, 1991), most appraisal theorists see emotional episodes as an ongoing emergent process that is characterized by continuous changes in the underlying appraisals, and focus on the dynamic nature of appraisal and its cumulative effect on the other components of an emotional response (Frijda, 1986; Scherer & Ellsworth, 2009). Thus, most appraisal theorists would agree that there are as many different emotional states as there are different dynamic appraisal outcomes. Secondly, and more importantly, the vast majority of appraisal theorists hold that appraisals have a causal role in the elicitation of emotion (see Ellsworth & Scherer, 2003; Roseman & Smith, 2001, for more detailed reviews and comparisons of different appraisal theories). Taken together, many contemporary appraisal theories share the core ideas that emotions are (a) caused by appraisals that (b) orchestrate a dynamically unfolding emotional response.

My aim in this contribution is to illustrate some similarities and some differences between contemporary appraisal and constructivist approaches. I argue that appraisal theories have already confronted the idea of construction in emotion, but without rejecting the notions of (a) the causal role of appraisals in emotion elicitation and (b) the adaptive value of emotional responses. I want to point out that appraisal and constructivist perspectives on the elicitation of emotional responses share many similarities, although the names of the different “ingredients” of emotions may be different.

What is Appraisal?

The common core of most appraisal theories is the assumption that emotional responses are elicited as the organism evaluates the relevance of environmental changes for its well-being. Magda Arnold (1960) introduced the term “appraisal” to point out that the mere unmediated perception of an event is not sufficient to elicit an emotional response (as suggested by William James, 1884, in his famous bear example), but that some minimal cognition is needed to set in motion the physiological changes that are then experienced as emotion. This cognition serves to determine whether a perceived object or situation is relevant to the concerns of the observer. Similar to a radar antenna, the organism constantly checks whether significant stimuli are present or absent, beneficial or harmful, easy or difficult to deal with. Contemporary appraisal theorists have elaborated the appraisal mechanisms underlying the elicitation of emotional responses in greater detail, including relatively simple, easily computable appraisal criteria such as novelty or pleasantness as well as more complex ones such as coping potential and consistency with one’s values (see Ellsworth & Scherer, 2003, for a comparison of the criteria developed by different theorists). The appraisal of a stimulus as relevant initiates the orchestration of an adaptive emotional response that helps the organism deal with the requirements of the situation, consisting of motivational changes (changes in action tendency,

such as approach vs. withdrawal), physiological changes (e.g., heart rate, skin conductance), changes in motor expression (in face, voice, and body), and changes in subjective feeling.

Whereas critics of appraisal theories often remark that appraisal processes cannot play an important role in the actual elicitation of the emotional response because they are too slow to cause rapid emotional reactions (see also Clore & Ortony, 2013), appraisal processes are thought to occur at different levels of processing complexity and may be based on different types of cognitive mechanisms (Moors, 2010). In fact, when Arnold introduced the term appraisal, she defined it as the “direct, immediate sense judgment of weal or woe” (Arnold, 1960, p. 175), emphasizing its “non-reflective, nonintellectual, and automatic nature.” Low-level appraisal processes may be based on rapid comparisons of a stimulus with preexisting stimulus templates or learned schemata, whereas high-level appraisal may involve more complex analysis based on propositional information and language (Leventhal & Scherer, 1987). For example, the appraisal of the pleasantness of an encountered object may occur at the sensory-motor level based on innate preferences or aversions (e.g., towards a sweet or bitter taste), at the schematic level based on learned preferences or aversions (e.g., after an acquired taste aversion due to food poisoning), or at the conceptual level involving anticipated or derived evaluations based on propositional knowledge (e.g., after reading a restaurant review).

The Implementation of Appraisal

Contemporary appraisal research starts to focus on the implementational level of process description (Marr, 1982), using neuroimaging methods to investigate the neural structures involved in the appraisal process (Brosch & Sander, 2013; Sander, Grandjean, & Scherer, 2005). Thus, instead of searching for brain regions that are dedicated to basic emotions, this research aims at identifying neural regions that implement the different criteria proposed by appraisal theorists. For example, while the amygdala was initially thought of as the neural implementation of fear, subsequent research has demonstrated amygdala activation to a large number of emotionally relevant stimuli (Sander, Grafman, & Zalla, 2003), modulated by inter- and intraindividual differences in needs, goals, and values (Cunningham & Brosch, 2012). Thus, the functional profile of the amygdala fits the notion of a relevance detector. Due to its anatomically central hub role, the amygdala is perfectly positioned to orchestrate the further processing of an incoming stimulus that is appraised as relevant by boosting the sensory processing of the stimulus via feedback connections to sensory areas (Brosch, Pourtois, Sander, & Vuilleumier, 2011) and recruiting further cortical areas involved in the refinement of the appraisal.

Constructivist approaches emphasize that there are no brain regions specific to emotion, but that emotions arise from the interaction of multiple regions implementing processes that are not uniquely emotional in nature. In the same vein, appraisal mechanisms are not exclusively emotional, as all incoming information is constantly appraised. This necessarily includes a lot of information processing that does not lead to the elicitation

of an emotion. In this context, it is conceptually important to distinguish between the mechanisms that evaluate specific appraisal criteria (e.g., goal congruence) and the outcomes of these appraisals (e.g., “this is goal-congruent!”). While appraisal mechanisms may rely on cognitive processes that are also used for nonemotional processing, emotions are elicited once these mechanisms perform their computations on information that is relevant to the concerns of the individual (Moors, 2007). Thus, at the neural level, appraisal mechanisms may rely on regions that also implement general cognitive functions. For example, the appraisal of goal congruence (the evaluation of whether an event facilitates progress toward the satisfaction of a goal or puts satisfaction out of reach, delays it, or makes additional effort necessary) may be implemented by anterior cingulate cortex (ACC), which is part of an integrated conflict-control loop subserving the monitoring of behavioral performance, detection of conflicts, and adjustment of top-down cognitive control (MacDonald, Cohen, Stenger, & Carter, 2000). However, the appraisal process becomes “emotional” once the appraisal mechanism actually processes a specific type of information (i.e., yields relevant outcomes) and starts triggering an emotional response in brain and body. For example, increased activation in ACC has been shown to closely predict increases in autonomic arousal (Critchley, Tang, Glaser, Butterworth, & Dolan, 2005) and negative affect (Spunt, Lieberman, Cohen, & Eisenberger, 2012), suggesting that ACC may indeed underlie the link between the detection of goal-incongruent information and the elicitation of affective responses (see Brosch & Sander, 2013, for further discussion).

In addition to identifying brain regions involved in the processing of appraisal criteria, implementational studies of appraisal furthermore allow testing temporal aspects, for example concerning the question of whether appraisal criteria can be computed rapidly enough to plausibly play a causal role in the elicitation of an emotion. And indeed, consistent with the idea that initial appraisal can occur via low-level, implicit processes that may involve only a few synaptic connections and little processing time (Leventhal & Scherer, 1987), neurochronometric studies have demonstrated electrophysiological markers of initial low-level appraisals such as novelty or pleasantness already at around 100 ms after stimulus onset, whereas markers of more complex and computationally demanding high-level appraisals such as goal congruence have been measured in a later time range of 400–450 ms (Grandjean & Scherer, 2008). Thus, the appraisal of a stimulus may begin with a rapid and relatively coarse low-level appraisal, which is then continuously refined and adjusted by successive processing that takes into account additional information, hence allowing to address more complex high-level appraisal criteria.

Constructing an Emotional Response

The appraisal process is not the only part of the emotional response. Once a stimulus or an event is appraised as relevant to the concerns of an individual, changes in the other components of the emotional response (physiology, action tendency, motor expression, subjective feeling) are initiated. Already an initial

low-level appraisal of a stimulus as novel may initiate a simple orienting response, heart rate deceleration, and increases in skin conductance response (Scherer, 2001). As the appraisal process unfolds further, and more complex appraisal criteria are evaluated, interoceptive feedback about changes in the different responses components may inform the ongoing appraisal process and be integrated with subsequent appraisals into a more elaborate evaluation (see Figure 1).

This perspective on the “construction” of an emotional response is quite compatible with current constructivist models. The conceptual act model (Barrett, 2006; Lindquist, 2013) suggests that emotions are created when people make meaning of changes in basic visceral feelings in a given context. The iterative reprocessing model (Cunningham et al., 2013; Cunningham, Zelazo, Packer, & van Bavel, 2007) suggests that emotions may arise due to changes in affective states in time. These states are presumably also based on the experience of changes in bodily states. As outlined before, an initial low-level appraisal may

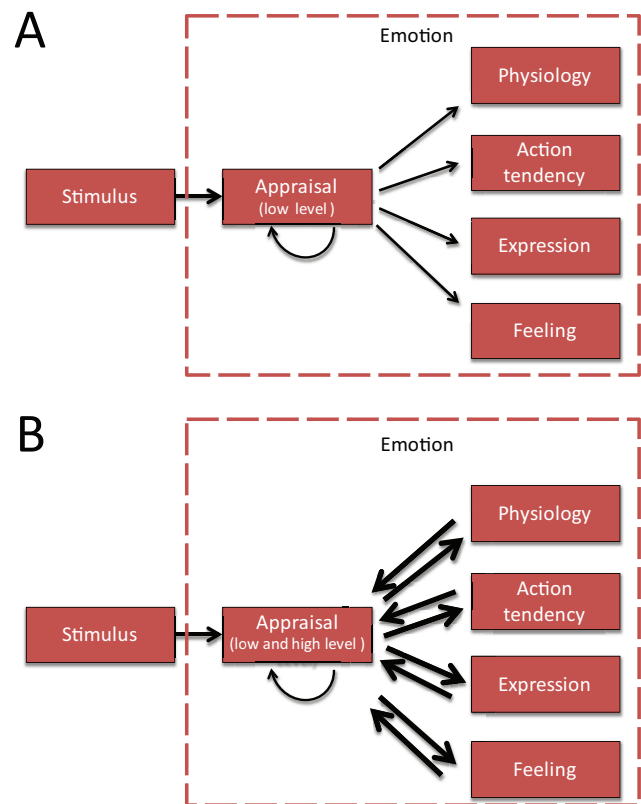


Figure 1. The unfolding of an emotional response. (A) Initial sweep: An initial low-level appraisal (based on rapid template matching or schema activation) is sufficient to launch an emotional response consisting of changes in the different emotional response components (such as physiology and action tendency). (B) Subsequent elaboration: As the appraisal process continues, higher-level appraisal criteria are evaluated (concerning, e.g., event likelihood, goal consistency, coping potential, or norm compatibility), and interoceptive feedback from initial changes in other response components (e.g., physiology) is integrated into the ongoing evaluation.

launch an emotional response consisting of physiological changes and changes in action tendencies. The experience of this physiological affect (similar to the concept of *core affect* or *affective state*) may then be integrated into the ongoing appraisal process and combined with other high-level appraisal results (somewhat similar to the *interpretive process* or *conceptual act*).

However, one point that is of crucial importance to appraisal theory is that the elicitation of the emotional response (including the change in physiology that is then fed back into the ongoing appraisal) is the result of an initial evaluation of the relevance of the situation for the concerns of the organism. The physiological response is important *because* it is caused by an initial appraisal, and thus the physiological response *in itself* is informative about the relevance of the currently experienced situation. Thus, the main difference between contemporary constructivist and appraisal approaches seems to be the question of whether changes in physiology/core affect in emotional situations are meaningful or not: Appraisal theories assume that physiological changes are both the result of an initial appraisal (of the situation), and the object of further appraisal (together with the situation). Constructivist theories assume that a physiological change with nonspecific cause is “appraised” or categorized in light of the situation. This in turn raises the questions of the functionality of an emotional response. Appraisal theories hold that physiological changes during an emotion are part of an adaptive response that prepares the organism to cope with a concern-relevant situation. Constructivist approaches put less emphasis on the “usefulness” of an emotional response, and see the functionality of emotions mainly in their role as organizing principles of our experience (Clare & Ortony, 2013; Lindquist, 2013).

Concluding Remarks

There are many similarities concerning the assumptions of appraisal theory and constructivist theory. Both agree that emotions are phenomena constructed of more basic psychological functions, which are not necessarily emotion-specific, and that it is important to investigate the more elemental aspects of emotion elicitation at the algorithmic and implementational levels (Marr, 1982). The “construction” of emotion from an appraisal perspective involves induction of bodily changes by low-level appraisal processes, which are in themselves informative about the relevance of the experienced situation, and thus may be meaningfully integrated into the ongoing evaluation.

While I have argued that appraisal theories should neither be depicted as natural kinds approaches nor completely be absorbed in constructivist accounts, I have also tried to demonstrate that modern appraisal and constructivist models of emotion use rather similar mechanisms to account for the genesis of emotional responses, even though the names of the “ingredients” may be different.

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